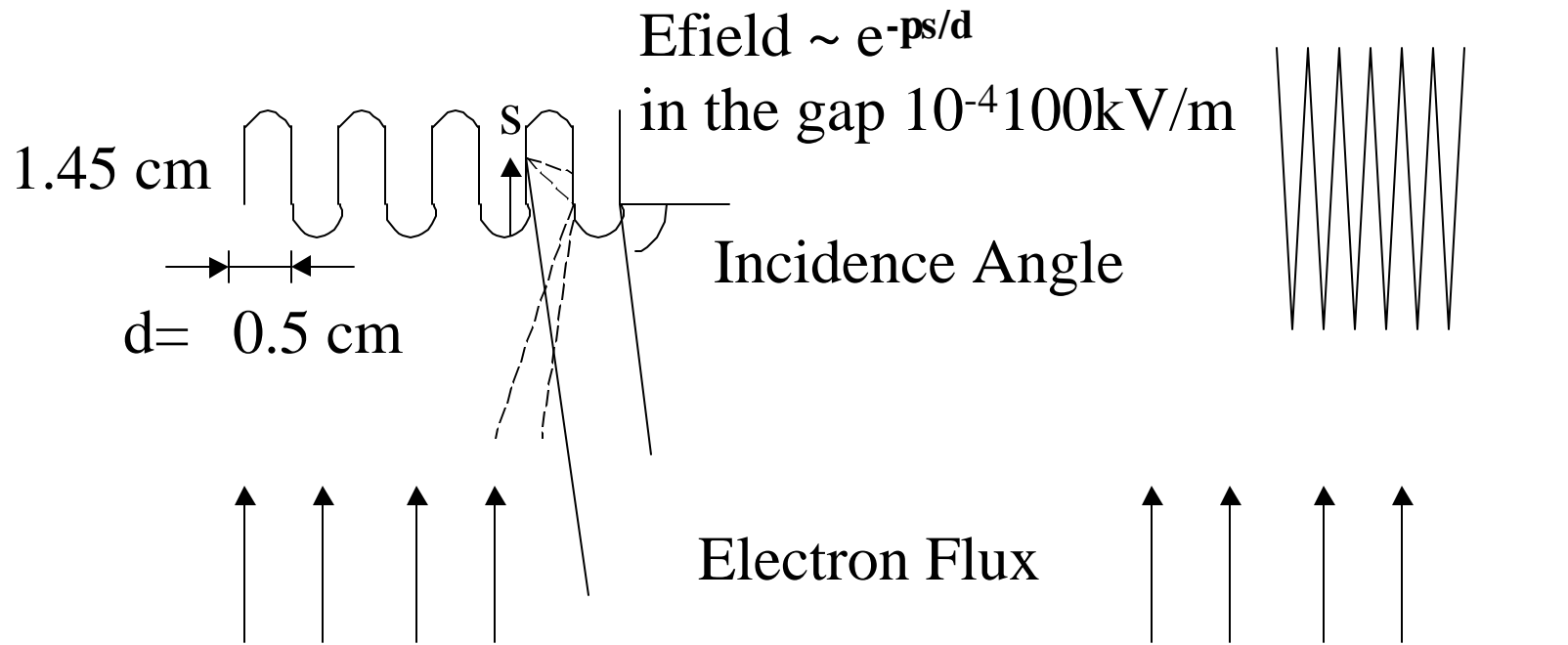


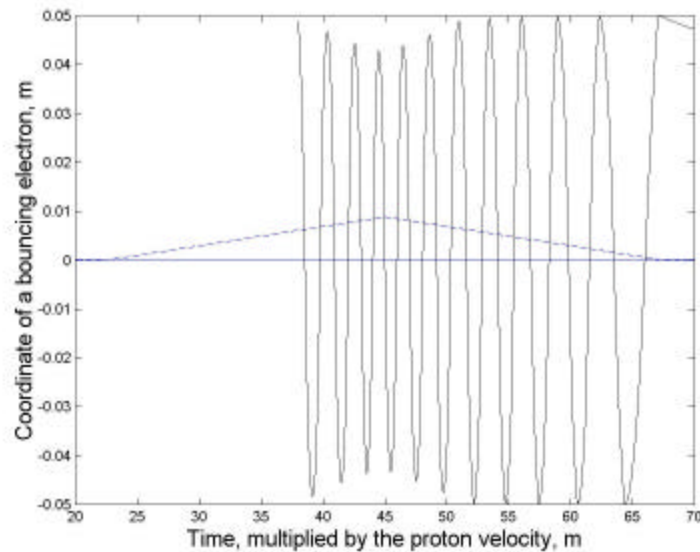
SNS bellow

PSR bellow



Proton Beam

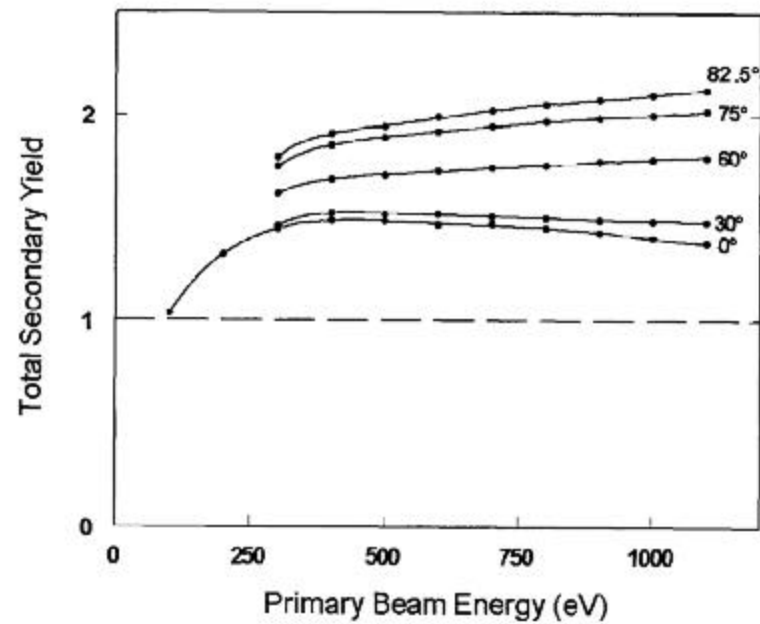
# Multipacting on the trailing edge



- Due to the decreasing electric field of the proton beam, electrons gain energy (around 300 eV).
- The effect for the SNS ring is stronger than for the PSR (LANL) due to the longer pulse and the larger aperture.
- For maximum SEM coefficient equal to 2 (e.g. SS), one electron at the center produces  $e^{10}$  secondary electrons.
- Safe SEM number is 1.5 (TiN coating gives about this)



## Yield vs. Incidence Angle



**TiN/Al, Grooves Parallel To Primary Electron Beam, No Conditioning**

The secondary emission from the bellows is determined by two phenomena with the opposite action: the electric field decay in the bellow valley and SEM dependence on the incident angle

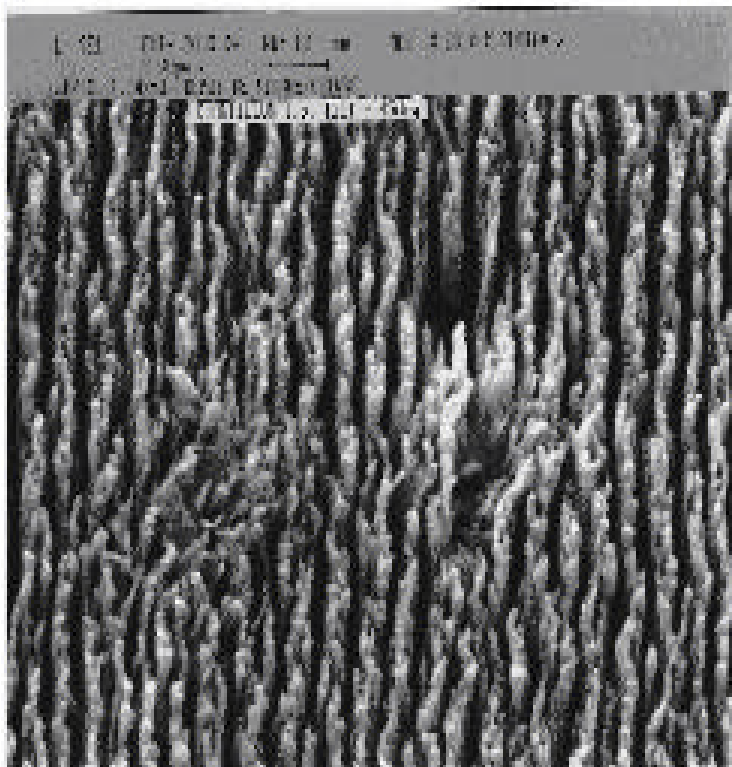
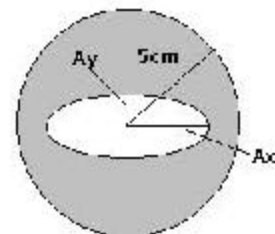
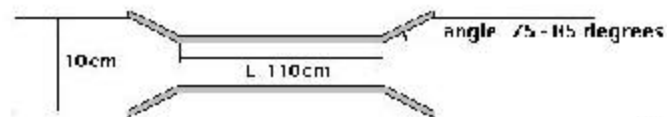


Figure 10: Photograph of a textured copper surface

- Shown dendritic surface has the SEM coefficient less than 0.5. The SEM electrons get stuck in the narrow gaps between pins, and the electric field can't penetrate into the valleys

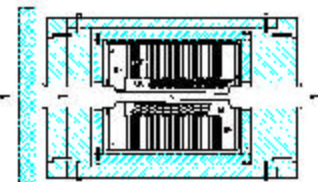
## Secondary collimators Absorbers (N. Simos)



Secondary 1  
Ax = 4.7cm  
Ay = 5.6cm

Secondary 2  
Ax = 7.0cm  
Ay = 4.1cm

COLLIMATOR  
SPLITS IN 1/4" & 1/2" HOLE  
SPLITS IN 1/4" & 1/2" HOLE  
SPLITS IN 1/4" & 1/2" HOLE  
SPLITS IN 1/4" & 1/2" HOLE  
SPLITS IN 1/4" & 1/2" HOLE



MONITOR  
LOW SPEED  
175 mm

FOR INNER & OUTER SHELLS  
COLLIMATOR BEAM HOLE HOLE  
MONITOR BEAM HOLE HOLE

COLLIMATOR COLLIMATOR COMPONENTS  
MONITOR BEAM

- Aperture  $300\pi \mu\text{m}$  Section  
changing along the collimator  
following  $\beta$